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## (54) Automatic trace analysis and comparison system for interactive learning and training systems

(57) The invention concerns a learning and training process, comprising:
- memorizing traces of a learner solving an exercise,
- attaching meta labels to the learner traces,
- comparing the learner traces to reference traces of a referent solving the exercise, meta labels being attached to the reference traces.

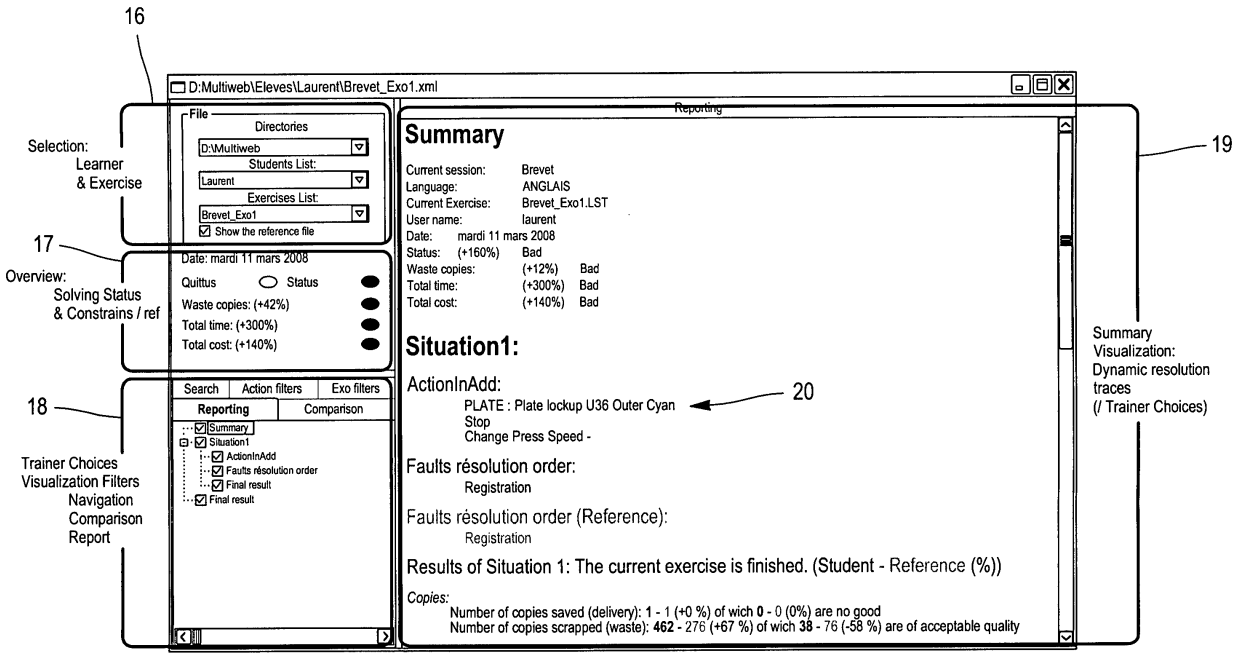


FIG. 4

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## Description

### Technical field

**[0001]** The present invention relates to a learning and training process, and to a system implementing this process.

**[0002]** Typically, a process or system according to the invention can be used for learning:

- how to use a device or a process, for example how to pilot an airplane, or how to manage a team,
- how to control or drive an industrial process, such as a graphic arts industry process (typically a printing process for producing books or newspapers), a chemical process (industrial process for producing drugs, materials, etc...), a mechanical process (industrial process for producing cars), etc....

### State of the Art

**[0003]** Systems and processes for learning how to control an industrial process already exist.

**[0004]** Such a system typically comprises a computer simulating the industrial process through simulation exercises, and generating traces for each action of a learner trying to solve one of the exercises.

**[0005]** Nevertheless, a teacher spend a lot of time for reading and studying the traces, in order to check if the exercise has been correctly solved and to see what are the difficulties of the learner.

**[0006]** The goal of the invention is to present a process and system for providing a more efficient learning and training.

### Summary of the Invention

**[0007]** An aspect of the invention concerns a learning and training process, comprising:

- memorizing traces of a learner solving an exercise,
- attaching meta labels to the learner traces,
- comparing the learner traces to reference traces of a referent solving the exercise, meta labels being attached to the reference traces

**[0008]** In this document, a user can be a referent or a learner. The referent can be an instructor, a trainer, a training coordinator, a normative user, an expert, an average user or a student (typically the best student among a group of students). The learner (or Trainee) is typically a student.

**[0009]** The meta labels are preferably structured XML meta labels.

**[0010]** The comparison step can comprise:

- deducing actions forgotten by the learner in relation to those carried out by the referent, and/or
- deducing unnecessary actions done by the learner in relation to those carried out by the referent, and/or
- comparing the sequence in which problems of the exercise were solved, and/or
- the use of a template file specifying a precision level for comparing the learner traces to the reference traces, and/or
- expressing in percentage a variance between referent results and the learner results; the results can comprise a virtual time for solving the exercise, virtual costs of the exercise and/or statistics on number of learner and referent actions concerning this exercise.

**[0011]** The exercise can be created by the referent.

**[0012]** The reference traces can be created by the referent according to the following steps:

- memorizing referent traces of the referent solving the exercise,

- attaching meta labels to the referent traces,

**[0013]** The meta labels of the learner traces can be memorized in a learner trace file, and the meta labels of the referent traces can be memorized in a referent trace file, the referent and learner trace files containing preferably only key words which are independent of the learner language.

**[0014]** The exercise can comprise one or more problems to solve. The referent traces can comprise at least one trace corresponding to an action that is not necessary to solve the one or more problems.

**[0015]** The exercise can contain a set of sequential situations, each situation containing one or more problems to solve, the learner having to solve each problem in a situation before moving on to the next situation. The process

according to the invention can comprise, at the end of each situation, generating a summary for that situation including the results of the learner concerning this situation. The results can comprise a virtual time for solving the situation, virtual costs of the situation and/or statistics on number of learner actions concerning this situation.

**[0016]** The process according to the invention can comprise a display of the referent traces and/or the learner traces, the process according to the invention comprising the step of filtering the displayed traces in order to display the traces:

- corresponding to a given problem and/or situation, and/or
- corresponding to a given type of action made by the referent and/or the learner to solve the exercise.

**[0017]** The process according to the invention can comprise a display of both reference and learner traces at the same time.

**[0018]** The process according to the invention can be implemented for the graphic arts industry as a print simulator.

**[0019]** Another aspect of the invention concerns a learning and training system implementing a process according to the invention.

**[0020]** More precisely, another aspect of the invention concerns a learning and training system comprising:

- means for memorizing traces of a learner solving an exercise,
- means for attaching meta labels to the learner traces,
- means for comparing the learner traces to reference traces of a referent solving the exercise, meta labels being attached to the reference traces

**[0021]** The meta labels can be structured XML meta labels

**[0022]** The comparison means can comprise:

- means for deducing actions forgotten by the learner in relation to those carried out by the referent, and/or
- means for deducing unnecessary actions done by the learner in relation to those carried out by the referent, and/or
- means for comparing the sequence in which problems of the exercise were solved, and/or
- means for expressing in percentage a variance between referent results and the learner results; the results comprise a virtual time for solving the exercise, virtual costs of the exercise and/or statistics on number of learner and referent actions concerning this exercise.

**[0023]** The system according to the invention can comprise means for creating the exercise.

**[0024]** The system according to the invention can comprise :

- means for memorizing referent traces of the referent solving the exercise,
- means for attaching meta labels to the referent traces,

**[0025]** The means for memorizing the learner traces can comprise means for memorizing the meta labels of the learner traces in a learner trace file, and the means for memorizing the learner traces can comprise means for memorizing the meta labels of the learner traces in a referent trace file, the referent and learner trace files containing preferably only key words which are independent of the learner language.

**[0026]** The exercise can comprise one or more problems to solve. The referent traces can comprise at least one trace corresponding to an action that is not necessary to solve the one or more problems.

**[0027]** The exercise can contain a set of sequential situations, each situation containing one or more problems to solve, the learner having to solve each problem in a situation before moving on to the next situation. The system according to the invention can comprise means for, at the end of each situation, generating a summary for that situation including the results of the learner concerning this situation. The results can comprise a virtual time for solving the situation, virtual costs of the situation and/or statistics on number of learner actions concerning this situation.

**[0028]** The system according to the invention can comprise means for displaying the referent traces and/or the learner traces. The system according to the invention can further comprise means for filtering the displayed traces in order to display the traces:

- corresponding to a given problem and/or situation, and/or
- corresponding to a given type of action made by the referent and/or the learner to solve the exercise

**[0029]** The display means can be arranged for displaying both reference and learner traces at the same time.

**[0030]** The comparison means can comprise means for using a template file specifying a precision level for comparing the learner traces to the reference traces.

**[0031]** The system according to the invention can be a print simulator.

**Detailed description of the figures and of realization modes of the invention**

**[0032]** Other advantages and characteristics of the invention will appear upon examination of the detailed description of embodiments which are no way limitative, and of the appended drawings in which:

- Figures 1 and 2 are schematic view of a process according to the invention,
- Figure 3 illustrates part of a learner trace file generated by a process according to the invention, and
- Figures 4 to 12 illustrate various displays implemented by a process according to the invention.

**[0033]** Referring to Figures 1 to 12, we will now describe a process according to the invention for automatically comparing the outputs of interactive learning systems so as to analyze the solution path of a trainee (also named learner) with regard that of a referent or "normative" user (expert, "average user", instructor, training coordinator, best student among a group of students, etc), and a system according to the invention. The system according to the invention takes as input the output from the learning system sessions and provides as output a variable depth analysis of the comparative results in such a manner as to enable the instructor to have a "quick overview" of all the trainee results compared to the "norm", and then to further analyze and compare any pair of results to see where they vary. These results are then used to "re-orient" the trainee if necessary or to validate their progress so that they may move on to the next stage of their learning process according to the invention. The current example is oriented towards systems which teach problem-solving for process control operators, and more particularly the printing and packaging process fields. The invention also covers a system which implements the process according to the invention.

**[0034]** The more general application of this invention is to any learning system in which the history of the learning session can be seen as the exploration of a non-directed graph, and where the trainee actions can be given « meta-labels » which serve as a basis for later comparison. Examples of such meta-labels are:

- "display process output",
- "use process quality control tool",
- "check on value of current process variable",
- "adjust value of current process variable";
- "ask for diagnostic help from the supervisory system",
- "give a 'quality' evaluation which states that the product is of good quality", etc.

**[0035]** Depending on the simulated process, the meta-labels can be changed without affecting the underlying solution methods to this general problem of comparing output from interactive learning systems (simulators, other interactive e-learning systems, etc.).

**General Overview of System Architecture**

**[0036]** The simulator system 6 according to the invention comprises:

- a computer, arranged for implementing a learning and training program; the learning and training program typically comprises a program for simulating a process (or "simulator program") through exercises to be solved by the trainee, preferably an industrial production process, and a trace analysis and comparison program,
- an interface console connected to the computer, this interface allowing a user to interact with the computer and with the process simulated by the computer in order to solve the exercise; a given interaction between the user and the computer via the console corresponds to a given action of the user on the simulated process; this interface console is specific to the training proposed by the system 6, and can typically comprise:

    - o a real console table that could be used to control a real press in a newspaper print industry site, if the system 6 simulates a press, or
    - o a dashboard of a plane, if the system 6 simulates an airplane flight, or
    - o a keyboard,
    - o etc...

**[0037]** The computer comprises:

- a central processing unit, an analogical circuit and/or an digital circuit arranged to implement the memorization,

meta labels attachment, trace generation, summary generation, comparison, deduction, expression, filtering or filter activation steps of the process according to the invention, and

- a screen arranged to implement the visualization and display steps of the process according to the invention.

**[0038]** As illustrated in figures 1 and 2, the preferential realization mode of the process according to the invention comprises the successive following steps A, B and C:

- A: The Instructor or Training Coordinator creates a problem 4 to be solved, more precisely at least one problem to be solved. This at least one problem is part of an exercise 5. The contents of the exercise 5 are linked to the learning goals at that stage and for that student or group of students. The instructor then solves the problem, or can designate the pre-existing solution of one of the other students as the « reference solution ». To create a solution (whether it is the « reference » or « learner » version), the following steps are followed:

  1 : The problem definition is loaded by the learning system 6 (for example, the press training simulator)
  2 : The user solves the exercise
  3: During this learning and problem-solving session, the learning system 6 memorizes all the traces 7 of the resolution and attaches structured XML meta labels to them.

- B. The Student (or learner or trainee) tries to solve the exercise:

  1 : The problem definition is loaded by the learning system 6 (for example the press training simulator)
  2 : The user (i.e the learner) solves the exercise
  3: During this learning and problem-solving session, the learning system memorizes all the traces 8 of the resolution and attaches structured XML meta labels to them

  This is clearly the same set of steps as those followed by the instructor.

- C : The instructor analyzes the solution steps for the student by using the Trace Comparison System 6. The instructor decides which set of traces to compare and analyze : one 7 from the "reference solution"; one 8 from a student solution:

  1 : These two sets of traces are loaded by the system 6.
  2 : The instructor can then analyze the results of the trace comparison by using the system 6 in one or more of the following modes:

  ■ Comparative overview of the solution : high level summary information only.
  ■ Choice of lower level information to compare (though application of « pre-programmed" types of filters which show or hide this type of information).
  ■ Line by line scrolling though the traces (at whatever level the filter are set : from all possible trace information to only some classes of trace information).
  ■ Automated comparison in two side-by side windows of the Instructor traces vs the user traces (the depth of information displayed is controlled by the active/inactive filters).
  ■ Report Generation.

**[0039]** See figure 2 for illustration.

***Advantages of this system :***

**[0040]** The flexibility of the meta label definitions; which can be adapted to various subject domains and applications, makes it extremely easy to evolve and enrich the system 6. The examples shown below have been implemented for the graphic arts industry, and in particular for a line of training simulators, but is obvious that the same type of approach can be applied to other learning systems which produce traces for later analysis.

**Implementation Description : more detailed view.**

***Meta Labels***

**[0041]** Our invention uses a set of meta labels which are independent of the type of problem to be solved. These meta labels structure the learning session traces in 3 sections : the Header 9, the Problem resolution 10, and the Summary 11.

**[0042]** The Header 9 contains all the contextual information about the exercise :

- which "Course" (named group of exercises),
- which Exercise (specific set of problems to solve or questions to answer),
- the user name,
- the language (English, French, Spanish, ...),
- the date on which this was done.

**[0043]** As shown in figures 1 and 2, an exercise can be thought of as a 'scenario', and contains a set of sequential 'situations' 12, each situation containing one or more problems 4 to solve. In this implementation the user (learner or referent) has to solve each problem in a situation 12 before moving on to the next situation 12.

**[0044]** The same structural aspects are found in the metalabels, Exercise, Situation, Problem, User Action, etc.

**[0045]** At end of each situation the learning program generates a summary 11 for that situation (and will of course generate a summary 11 for the session as a whole)

**[0046]** This summary 11 gives an overview of the 'quality' of the solution, it includes:

- The results : why the situation ended (no more problems, predefined limits exceeded in terms of time, cost or amount produced)
- Information relative to the session (if a production simulation : quantity of good and bad product produced, etc).
- The « virtual time » for the situation (these can be included on times assigned to each user action as well as the machine production time), the simulated process « downtime » due to simulator machine breakdowns, and when the user has carried out specific actions, a subtotal for these actions.
- The Costs of the situation : these include costs for bad quality product as well as downtime costs.
- Statistics on number of user actions, number or machine stops, etc.

**[0047]** The overall session summary will include the subtotals for each situation.

**[0048]** For the problem solving, a large proportion of the meta labels can be domain specific. If we take the example of print simulators (our first and preferred implementation of this invention), we have defined the following high level categories for User Actions:

■ Console Action (press console - could also be Cockpit adjustments for a Flight simulator)
■ Manual Action (on the production machine - here a printing press, could be a numerically controlled machine (NCM) tool)
■ The display of simulated output (a "print copy" for a print simulator, a machined piece for a NCM simulator)
■ The "display type for the output" (for a print copy: the whole printed sheet, one page, current print compared to 'soft proof' -for other systems, the current output, perhaps in comparison to the desired output).
■ The "quality control tools" used (for printing: magnifier, densitometer, spectrophotometer, etc; for other domains, calipers, laser distance measurements, etc.)
■ The user of the "diagnostic help system" and the depth of help accessed (fault name, potential causes, location of the fault, actual cause, suggested remedy, etc.).
■ Outside events occurring during the learning sessions (there can be triggered by the operator, the trainer or the system itself), but are not part of the "predefined exercise".

**[0049]** Each of these categories contains sub-categories which contain all the necessary information for the instructor and for the Automatic Trace Comparison system; the ensemble of these categories is sufficient for the purposes of evaluating the learner's problem resolution.

***Summary of Trace Types and Structures :***

**[0050]** The system allows a global overview and synthesis of the learning session traces for a given exercise.

**[0051]** By visualizing :

- the Header information;
- the actions "forgotten" or "unnecessary" on the part of the learner (these are differences with the "reference" trace);
- the summary information for each situation;
- the order in which problems were solved within each situation ("best practice" generally requires that in manufacturing processes, process stability take precedence over product quality, etc) and the comparison of these sequences between reference and learner traces.

**[0052]** The system permits the instructor to get a quick overview of the learner results, and thus decide what the

strengths and weaknesses of a particular learner may be, and which learners are having the most problems and need the most immediate attention.

**[0053]** If this "overview" level proves insufficient, and/or the instructor wishes to do a more detailed analysis of the leaning sessions, the appropriate "filters" can be activated to show the lower level data for both sets of traces (reference and learner).

***Navigation functions within the trace files :***

**[0054]** One of the primary functions is to allow navigation (visualization at different file positions).

**[0055]** To this end, the system allows the user to chose a part of the resolution and then "unfold"' it to see the full level of detail.

**[0056]** More generally, with regard to the full set of traces and their labels, each type of meta label can be "unfolded" or "refolded" so that the full levels of detail are visible.

**[0057]** The user traces; in whatever their current level of display, can be saved at any time to external text files for later treatment or consultation.

**[0058]** The instructor can also "position" themselves in the trace file in respect to a specific type of meta-label and level of detail; when these are chosen in either the reference or user traces, the system then displays the same sort of data in the other trace file. Of course if the information is NOT present in the other file, there will be no corresponding display.

***Automatic Comparison :***

**[0059]** In our initial application domain (print simulators), one of the basic comparison points is the display of the simulated output. It is at this time that the learning program automatically generates a list of current production problems. This list includes both problems due to the predefined exercises and those which have been caused by user action or inaction.

**[0060]** By comparing the problems present in these lists (between two displays of the output), the system deduces the problems solved in the interval between the two displays. By then comparing the actions of the reference and learner traces, the system deduces those which are common to both and those which are not.

**[0061]** For each problem resolution step, the system can thus deduce :

- Those actions or controls "forgotten" by the learner in relation to those carried out by the referent, that means those actions or controls not carried out by the learner in relation to those carried out by the referent.
- Those actions or controls "unnecessary" - and thus time consuming and cost generating - done by the learner.

**[0062]** In addition, the system does a direct comparison of the summary information of each situation, and of the exercise as a whole, expressing in percentages the learner results (number of actions, costs) and the variance between the referent and the learner.

**First Example of System use**

**[0063]** We are now going to describe a first example of use of the system 6. In the prior Steps:

- The instructor has created an exercise (structured learning situation)
- The instructor has created the reference traces (or has adopted one set of existing results as being the reference)
- The learner has solved (or tried to solve) the exercise, thus producing a trace file,

Now the instructor wishes to analyze and compare these two trace files.

**[0064]** As an illustration, we will take a simple exercise with only one situation and only one problem to solve within that situation. In this example, implemented for the graphic arts industry, the system 6 is a press simulator. Here the problem is one of "color-to color registration", the color involved is Cyan, and the print unit involved is tower n°2, front side of the web, and in this case page n°1 of the newspaper.

**[0065]** Below (also illustrated in figure 3) is an example of the XML traces generated by the simulator 6, and the meta labels used.

```
<Trace>
<Head>
        <SessionName>Brevet</SessionName>
        <Language>ANGLAIS</Language>
        <ExerciseName>Brevet_Exo1.LST</ExerciseName>
        ...
</Head>
<Exercise>
        <Situation>
                <Order>1</Order>
                <Malfunctions>
                        <Malfunction>Register_P1.DYS</Malfunction>
                </Malfunctions>
                <UserActions>
                        <UserAction>
                                <ButtonAdjustment>
                                        <Type>TRACE75</Type>
                                </ButtonAdjustment>
                        </UserAction>
                        <UserAction>
                                <ButtonAdjustment>
                                        <Type>TRACE76</Type>
                                </ButtonAdjustment>
                        </UserAction>
                        <UserAction>
                                <PullACopy>
                                        <OkToSave>DIAGNOS_4</OkToSave>
                                        <FamilyFaultList>
                                                <FamilyFault>
                                                        <Name>DIAGNOS_9</Name>
                                                        <FaultsList>
                                                                <Exo>

        <Name>reperage</Name>
                                                                </Exo>
                                                        </FaultsList>
                                                </FamilyFault>
                                        </FamilyFaultList>
                                </PullACopy>
                        </UserAction>
                        ...
```

**[0066]** This file corresponds to the start of the XML trace file which constitutes our example.

**[0067]** It contains the headers 9 for the "general information", then the description of the first situation 12, and after that it shows the description of three user actions 13, 14, 15. The first two actions 13, 14 concern the start-up of the machine, and the third 15 is the user display of the simulated output. It can be noted that the third action also shows the automatic diagnosis of current production faults (or of the fact that there are none).

**[0068]** It should also be noted that there is no "surface" text in these XML files, they contain only key words which are independent of the user language, and which are replaced by the appropriate terms in the user language when the file

is interpreted and visualized by the system. This is important, as it permits an instructor in (eg English) to analyze the traces of a solution done in another language (eg Chinese).

**[0069]** Now we will give examples of the system's possibilities.

**[0070]** The system (trace comparison and analysis) has four primary display and control zones :

- Select the traces to compare
- Get an overview of the exercise resolution and results
- Instructors choice of viewing perspective and depth (filters, search keys, comparisons, reports)
- Comparison of learner and reference trace resolutions

**[0071]** These are shown in figure 4. The system display has four main zones :

- Zone 16 for selecting traces to analyse and compare (this zone 16 is labelled "Selection" in figure 4)
- Zone 17 displaying and giving global results of the comparison (trainee waste compared to reference waste, etc) (this zone 17 is labelled "Overview" in figure 4)
- Zone 18 for Trainer choices on display and visualization contents and level of detail (this zone 18 is labelled "Trainer choices" in figure 4)
- Zone 19 in which traces are displayed and visualized according to choices made in other three zones. In zone 19, it is possible to navigate through the listing. (this zone 19 is labelled "Summary" in example below)

**[0072]** For example in Zone 19, labelled the "Summary", we see that the user did an unnecessary action 20 (Action-InAdd), and that their total cost was 140% of the reference cost.

**Visualization choices. Exercise level Filters (see figure 5)**

**[0073]** As illustrated in figure 5, at the highest level of selection the instructor can determine, by using zone 18, which kinds of information will be displayed and visualized. Here we see that all the types of information will be visualized. In the following examples, we will see how the choice is made for the level of detail visualized for each type of information.

**Visualization :**

**Information types : Actions and their Filters (see figure 6)**

**[0074]** As illustrated in figure 6, we can see that the instructor can choose the degree to which he wishes to see the various types of actions : be they on the control console, on the Quality Analysis tools, or on the machine checks and adjustments not available from the control console (Menu-Check).

**Navigation : (Search/Position Criteria)**

**These determine the "intelligent" research in the trace files. (see figure 7)**

**[0075]** As illustrated in figure 7, the various categories of interaction by the user are color-coded for easier recognition. The ONLY interactions shown are those which actually took place - they are the only ones pertinent for search within these particular traces.

**[0076]** By "intelligent" search and position we mean that if, for example, the instructor wishes to be positioned on the first check (menu check) carried out both by instructor and user, this becomes possible by choosing the appropriate item in the list. If the instructor wishes to see where in their detailed list of interaction the fist control of "plate condition" was done, this also is possible.

**[0077]** The resulting position in the trace file, then allows to see all the context of interaction before and after this position and thus to analyze it in context if necessary. (ex. criticize method, not just results).

**Example of Navigation (see figure 8):**

**[0078]**

As illustrated in figure 8, we note that :

- The scroll bar 21 lets us move around with in the displayed data, and thus see the context in which the chosen

search item was embedded.

- The color-coded bar 22 on the right of the file give us an overview of the types of trace information (same color coding as in the search criteria)
- The black position markers 23 in the color-coded bar reflect the recent selections.
- The current selection 24 is highlighted (in this case it is "plate lockup"). It also blinks, but that is not visible on this screen capture.

**Visualization of both reference and student traces at same time (see figure 9).**

**[0079]** On the visualization illustrated in figure 9, both sets of traces are shown at the same time. This makes it even easier for the instructor to analyze the reasons for the differences between the two.

**[0080]** When the "common" visualization parameter is selected from among the "comparison" parameters, the same action done by both student and referent are highlighted. We can see here that they were not done in the same sequence of actions (the contest is different)

**[0081]** Actions (potentially unnecessary) done by the learner but NOT by the referent will be highlighted if the "Actions In Add" parameter is selected (this is not the case in figure 9). In the prior screen captures, you will notice that the learner DID additional actions, in particular stopping the press to check on the plate position, which the referent did not do - this changes the final costs considerable.

**[0082]** As for other items, the current selection will "blink" as well as being highlighted.

**Report Visualization Filters (see figure 10):**

**[0083]** As illustrated in figure 10, when the automatically generated reports are shown, the level of detail of these can be chosen by selecting the appropriate parameters from among the "Reporting Filters"

**[0084]** For example, if the unnecessary actions by the learner are not interesting to the instructor for the report to be generated, the ActionInAdd filter will be deselected.

**Backup and Print Out**

**[0085]** All information shown in the "visualization" zones can be saved as a text file and printed out as necessary. This makes it possible to have a full and formal track of all training results for each trainee.

**Second Example of System use**

**[0086]** We are now going to describe a second example of use of the system 6, with regard to its differences compared to the first example. In this second example, we will take a simple exercise with only one situation and only two problems to solve within that situation. In this example, implemented for the graphic arts industry, the system 6 is a press simulator simulating the print of products such as newspapers or books. Here the problems to solve are:

- a wrong console adjustment of an Ink Screw, leading to an inking fault, and
- a mechanical problem of the simulated press, the Cutting Anvil being worn, leading to dog ears and crooked Cross Fold.

**[0087]** In the prior Steps:

- The instructor has created the exercise (structured learning situation)
- The instructor is the referent and has created the reference traces (or has adopted one set of existing results as being the reference)
- The learner has solved (or tried to solve) the exercise, thus producing a trace file.

**[0088]** As previously, each trace of a user corresponds to an action done by the user (the user being the referent or the learner) onto the simulated process via the interface console of the system 6, or corresponds to a result of one of these actions. In other words, for each action of a user interacting with the simulated process via the interface console of the system 6, the system generates and memorizes:

- a trace for this action (for example in the traces below, the action can be the use of the Start Up Button for starting the press, the action of pulling a copy of the product printed by the press, the use of the Stop Button for stopping the press, the action of checking the Folding Knife Condition, the action of checking the Cutting Anvil Condition, the

action of Changing the knife cutting anvil, the action of adjusting an Ink Screw and the quantification of the adjustment, the action of using a Densitometer for measuring a color density corresponding to an ink screw, the action of using the help menu, the use of the Emergency Button for stopping the press), and

- a trace for the result of this action if any (for example in the traces below, the result can be a warning that there are inking faults and/or crocked folds and/or dog ears on the product when the user pulls a copy of the product printed by the press, warning if there is a problem or not after checking the Folding Knife Condition or the Cutting Anvil Condition, measured color densities when the user uses a Densitometer, the displayed message when the user uses the help menu, a time and/ or penalty time and/or cost and/or penalty cost of an action).

**[0089]** Each action belongs preferentially to one of these categories:

- an action of modifying something in the simulated printing process (for example the use of the Start Up Button for starting the press, the use of the Stop Button for stopping the press, the use of the Emergency Button for stopping the press, the action of Changing the knife cutting anvil, the action of adjusting an Ink Screw and the quantification of the adjustment)
- an action of observing something in the simulated printing process (for example the action of pulling a copy of the product printed by the press, the action of checking the Folding Knife Condition, the action of checking the Cutting Anvil Condition)
- an action of measuring something in the simulated printing process (for example the action of using a Densitometer for measuring a color density corresponding to an ink screw)

**[0090]** For each memorized trace (referent trace or learner trace), the system 6 attaches structured XML meta labels to this trace.

**[0091]** Below is an example of the referent traces generated by the simulator 6 and memorized in a referent trace file. For a better clarity, these traces are not shown with the used XML meta labels which are independent of the learner language:

---

*Current session:*
*Language:* ***French***
*Current Exercise:* ***demo.LST***
*User name:* ***reference***
*Date:* ***February 16th, 2008***
***Situation 1***

*Malfunction :****demo1.DYS***

*Malfunction :****demo2.DYS***

*Button:* ***Start Up***

*Button:* ***Auto***

*Button:* ***Auto***

*Pull a copy:* ***PAY ATTENTION : you haven't yet reached saleable quality***
***You have to find an inking fault(s).***
*Exo: Inking*
***The folds are off.***
*Exo: Cross Fold crooked*
***There are dog ears.***
*Exo: Dog-ear*

*Button:* ***Stop***

*Menu check:* ***FOLDING_COLLECTING_CYLINDER : Folding Knife Condition***
*Location:* ***1***
*Cost:* ***0*** *Time:* ***00:00***
*Result:* ***No problem***

*Menu check:* ***FOLDING_COLLECTING_CYLINDER : Cutting Anvil Condition***
*Location:* ***1***
*Cost:* ***0*** *Time:* ***00:00***
*Result:* ***Cutting anvil worn.***

*Menu action:* ***FOLDING_COLLECTING_CYLINDER : Change knife cutting anvil***
*Location:* ***1***

*Cost:* ***0*** *Time:* ***00:00***
*Result:* ***ACTION ACCOMPLISHED***

*Button:* ***Start Up***

*Button:* ***Auto***

*Button:* ***Auto***

*Pull a copy:* ***PAY ATTENTION : you haven't yet reached saleable quality***
***You have to find an inking fault(s).***
*Exo: Inking*

*Visualization mode:* ***1 Page + Color OK***

*Magnifier: Page:* ***A1***

*Console adjustment:* ***Ink Screw Nø***
*Location:* ***U35 Outer Magenta FS***
*Value =* ***+0.00, +0.00, -16.00, -17.00, -19.00, -21.00, +0.00, +0.00***

*Pull a copy:* ***Your copy is OK to save!***

*Result of Situation 1: The current exercise is finished.*

***Copies:***
*Number of copies saved (delivery):* ***21*** *of which* ***0*** *are no good*
*Number of copies scrapped (waste):* ***427*** *of which* ***30*** *are of acceptable quality*
***Time:***
*Run time:* ***00:05***
*Web break and folder jam time:* ***00:00***
*Checks and actions time:* ***00:00***
*HelpLevelTime:* ***00:00***
*TOTAL TIME:* ***00:05***
*Multimedia Time:* ***00:00***
***Costs:***
*Delivered copies cost:* ***3***
*Wasted copies cost:* ***64***
*Web break and folder jam cost:* ***0***
*Checks and actions cost:* ***0***
*Material Machine cost:* ***62***
*HelpLevelCost:* ***0***
*TOTAL COST:* ***129***
***Statistics:***
*Number of console adjustments:* ***1***
*Number of menu check:* ***2***
*Number of menu action:* ***1***
*Number of press stop:* ***0***

*Final result: The current exercise is finished.*

***Copies:***

*Number of copies saved (delivery):* ***21*** *of which* ***0*** *are no good*
*Number of copies scrapped (waste):* ***427*** *of which* ***30*** *are of acceptable quality*

***Time:***

*Run time:* ***00:05***
*Web break and folder jam time:* ***00:00***
*Checks and actions time:* ***00:00***
*HelpLevelTime:* ***00:00***
*TOTAL TIME:* ***00:05***
*Multimedia Time:* ***00:00***

***Costs:***

*Delivered copies cost:* ***3***
*Wasted copies cost:* ***64***
*Web break and folder jam cost:* ***0***
*Checks and actions cost:* ***0***
*Material Machine cost:* ***62***
*HelpLevelCost:* ***0***
*TOTAL COST:* ***129***

***Statistics:***

*Number of console adjustments:* ***1***
*Number of menu check:* ***2***
*Number of menu action:* ***1***
*Number of press stop:* ***0***

---

**[0092]** The referent solves the mechanical problem before the inking problem, because the mechanical problem is more critical: it could lead to a paper jam in the press and damage the press.

**[0093]** Further more, the referent traces comprise an action that is not necessary to solve any problem of the exercise. Indeed, the referent checks the Folding Knife Condition, whereas the Folding Knife has no problem. This is because the Folding Knife is the more usual cause of folding problems, and a good student should know that and should check the Folding Knife Condition before checking the Cutting Anvil condition.

**[0094]** Below is an example of the learner traces generated by the simulator 6 in a learner trace file. For a better clarity, these traces are not shown with the used XML meta labels which are independent of the learner language:

---

*Current session:*
*Language:* ***French***
*Current Exercise:* ***demo.LST***

*User name:* ***laurent***
*Date:* ***February 16th, 2008***
***Situation 1***

*Malfunction :****demo1.DYS***

*Malfunction :****demo2.DYS***

*Button:* ***Start Up***

*Button:* ***Auto***

*Button:* ***Auto***

*Pull a copy:* ***PAY ATTENTION : you haven't yet reached saleable quality***
***You have to find an inking fault(s).***
*Exo: Inking*
***The folds are off.***
*Exo: Cross Fold crooked*
***There are dog ears.***
*Exo: Dog-ear*

*Visualization mode:* ***Display 8 page***

*Visualization mode:* ***2-Page Section***

*Visualization mode:* ***1 Page + Color OK***

*Densitometer:*
*Page:* ***C1***
*Screw N°* ***4***
*Density:*
***Cyan: 0.90***
***Magenta: 1.18***
***Yellow: 0.85***
***Black: 1.05***

*Console adjustment:* ***Ink Screw Nø***
*Location:* ***U35 Outer Magenta FS***
*Value =* ***+0.00, +0.00, -11.00, -11.00, -11.00, -11.00, +0.00, +0.00***

*Pull a copy:* ***PAY ATTENTION : you haven't yet reached saleable quality***
***You have to find an inking fault(s).***
*Exo: Inking*
***The folds are off.***
*Exo: Cross Fold crooked*
***There are dog ears.***
*Exo: Dog-ear*

*Densitometer:*
*Page:* ***C1***
*Screw N°* ***5***
*Density:*
***Cyan: 0.90***
***Magenta: 0.98***
***Yellow: 0.85***
***Black: 1.05***

*Console adjustment:* ***Ink Screw Nø***
*Location:* ***U35 Outer Magenta FS***
*Value =* ***+0.00, +0.00, -3.00, -3.00, -9.00, -9.00, +0.00, +0.00***

*Pull a copy:* ***PAY ATTENTION : you haven't yet reached saleable quality***
***The folds are off.***
*Exo: Cross Fold crooked*
***There are dog ears.***
*Exo: Dog-ear*

*Help:* ***Level 7 : + How to repairs the problem***
*Penalty time:* ***00:30***
*Penalty cost:* ***59***

*Menu check:* ***FOLDING_COLLECTING_CYLINDER : Cutting Anvil Condition***
*Location:* ***1***
*Cost:* ***0*** *Time:* ***00:00***
*Result:* ***You have to stop the press before checking.***

*Button:* ***Emergency***

*Menu check:* ***FOLDING_COLLECTING_CYLINDER : Cutting Anvil Condition***
*Location:* ***1***
*Cost:* ***0*** *Time:* ***00:00***
*Result:* ***Cutting anvil worn.***

*Menu action:* ***FOLDING_COLLECTING_CYLINDER : Change knife cutting anvil***
*Location:* ***1***
*Cost:* ***0*** *Time:* ***00:00***
*Result:* ***ACTION ACCOMPLISHED***

*Button:* ***Start Up***

*Button:* ***Auto***

*Button:* ***Auto***

*Pull a copy:* ***Your copy is OK to save!***

*Result of Situation 1: The current exercise is finished.*

***Copies:***

*Number of copies saved (delivery):* ***15*** *of which* ***0*** *are no good*
*Number of copies scrapped (waste):* ***705*** *of which* ***14*** *are of acceptable quality*

***Time:***

*Run time:* ***00:06***
*Web break and folder jam time:* ***00:00***
*Checks and actions time:* ***00:00***
*HelpLevelTime:* ***00:30***
*TOTAL TIME:* ***00:36***
*Multimedia Time:* ***00:00***

***Costs:***

*Delivered copies cost:* ***2***
*Wasted copies cost:* ***105***
*Web break and folder jam cost:* ***0***
*Checks and actions cost:* ***0***
*Material Machine cost:* ***450***
*HelpLevelCost:* ***59***
*TOTAL COST:* ***617***

***Statistics:***

*Number of console adjustments:* ***2***
*Number of menu check:* ***2***
*Number of menu action:* ***1***
*Number of press stop:* ***0***

*Final result: The current exercise is finished.*

***Copies:***

*Number of copies saved (delivery):* ***15*** *of which* ***0*** *are no good*
*Number of copies scrapped (waste):* ***705*** *of which* ***14*** *are of acceptable quality*

***Time:***

*Run time:* ***00:06***
*Web break and folder jam time:* ***00:00***
*Checks and actions time:* ***00:00***
*HelpLevelTime:* ***00:30***
*TOTAL TIME:* ***00:36***
*Multimedia Time:* ***00:00***

***Costs:***

*Delivered copies cost:* ***2***
*Wasted copies cost:* ***105***
*Web break and folder jam cost:* ***0***
*Checks and actions cost:* ***0***
*Material Machine cost:* ***450***
*HelpLevelCost:* ***59***
*TOTAL COST:* ***617***

***Statistics:***

*Number of console adjustments:* ***2***

*Number of menu check:* ***2***
*Number of menu action:* ***1***
*Number of press stop:* ***0***

---

**[0095]** Then, the system 6 compares the learner traces and the referent traces. This comparison uses a C++ algorithm using XML meta labels, and a template file which specifies the precision level of the comparison. This comparison algorithm is arranged for:

- reading the referent trace file and, for each referent action of the referent traces, looking for the same action in the learner trace file, and then deducing actions not carried out or forgotten by the learner in relation to those carried out by the referent; the template file specifies the precision level of the comparison. For example, if the referent trace file comprises a trace of adjusting an Ink Screw for a given color with a given value, and if the learner trace file comprises a trace of adjusting the same Ink Screw for the same color but with a different value, the system 6 concludes that the adjusting trace is not missing in the learner traces, because the template file specifies that the number of the screw and the adjusted color are important for the comparison but not the value of the adjustment;
- reading the learner trace file and, for each learner action of the learner traces, looking for the same action in the referent trace file, and then deducing unnecessary actions done by the learner but not carried out by the referent. The template file specifies the precision level of the comparison. For example, if the referent trace file comprises only one trace of adjusting an Ink Screw for a given color, and if the learner trace file comprises many traces of adjusting the same Ink Screw for the same color, the system 6 concludes that the supplementary adjusting actions are not unnecessary actions done by the learner, because the template file specifies that the number of adjustments does not matter;
- reading the learner trace file and deducing a learner problem resolution sequence, reading the referent trace file and deducing a referent problem resolution sequence, and then comparing the sequences in which problems were solved by the learner and by the referent, that is deducing the difference(s) between the learner sequence and the referent sequence;
- reading the learner trace file and the referent trace file and deducing in percentage a variance between referent results and the learner results, these results comprising for example a virtual time for solving the exercise, virtual costs of the exercise and/or statistics on number of learner and referent actions concerning this exercise

**[0096]** The system 6 collects and memorizes all this deduced information in an Overview file that thus comprises the following information:

---

***Summary***

*Current session:*
*Language:* ***French***
*Current Exercise:* ***demo.LST***
*User name:* ***laurent***
*Date:* ***February 16th, 2008***
*Status:* ***(+351%)Bad***
*Waste copies:* ***(+57%)Bad***
*Total time:* ***(+620%)*** ***Bad***
*Total cost:* ***(+378%)*** ***Bad***

***Situation1:***

*ActionInAdd:*
*Emergency*

*ActionForgeted:*
*Stop*
*FOLDING_COLLECTING_CYLINDER : Folding Knife Condition 1*

*Faults resolution order:*
*Inking*
*Cross Fold crooked*
*Dog-ear*

*Faults resolution order (Reference):*
*Cross Fold crooked*
*Dog-ear*
*Inking*

*Result of Situation 1: The current exercise is finished. (Student - Reference (%))*

***Copies:***

*Number of copies saved (delivery):* ***15 - 21 (-28 %)*** *of which* ***0 - 0 (0%)*** *are no good*

*Number of copies scrapped (waste):* ***705 - 427 (+65 %)*** *of which* ***14 - 30 (-53 %)*** *are of acceptable quality*

***Time:***

*Run time:* ***00:06 - 00:05 (+20 %)***
*Web break and folder jam time:* ***00:00 - 00:00 (0%)***
*Checks and actions time:* ***00:00 - 00:00 (0%)***
*HelpLevelTime:* ***00:30 - _Situation1:00 (0%)***
*TOTAL TIME:* ***00:36 - 00:05 (+620 %)***
*Multimedia Time:* ***00:00 - 00:00 (0%)***

***Costs:***

*Delivered copies cost:* ***2 - 3 (-33 %)***
*Wasted copies cost:* ***105 - 0 (0%)***
*Web break and folder jam cost:* ***0 - 0 (0%)***
*Checks and actions cost:* ***0 - 0 (0%)***
*Material Machine cost:* ***450 - 62 (+625 %)***
*HelpLevelCost:* ***59 - 0 (0%)***
*TOTAL COST:* ***617 - 129 (+378 %)***

***Statistics:***

*Number of console adjustments:* ***2***
*Number of menu check:* ***2***
*Number of menu action:* ***1***
*Number of press stop:* ***0***

*Final result: The current exercise is finished. (Student - Reference (%))*

***Copies:***

*Number of copies saved (delivery):* ***15 - 21 (-28 %)*** *of which* ***0 - 0 (0%)*** *are no good*

*Number of copies scrapped (waste):* ***705 - 427 (+65 %)*** *of which* ***14 - 30 (-53 %)*** *are of acceptable quality*

***Time:***

*Run time:* ***00:06 - 00:05 (+20 %)***
*Web break and folder jam time:* ***00:00 - 00:00 (0%)***
*Checks and actions time:* ***00:00 - 00:00 (0%)***
*HelpLevelTime:* ***00:30 - _Situation1:00 (0%)***
*TOTAL TIME:* ***00:36 - 00:05 (+620 %)***
*Multimedia Time:* ***00:00 - 00:00 (0%)***

***Costs:***

*Delivered copies cost:* ***2 - 3 (-33 %)***
*Wasted copies cost:* ***105 - 0 (0%)***
*Web break and folder jam cost:* ***0 - 0 (0%)***
*Checks and actions cost:* ***0 - 0 (0%)***
*Material Machine cost:* ***450 - 62 (+625 %)***
*HelpLevelCost:* ***59 - 0 (0%)***
*TOTAL COST:* ***617 - 129 (+378 %)***

***Statistics:***

*Number of console adjustments:* ***2***
*Number of menu check:* ***2***
*Number of menu action:* ***1***

*Number of press stop:* ***0***

---

---

**[0097]** As seen in this overview file:

- the learner did the following unnecessary action: use of the Emergency Button to stop the press instead of the use of the Stop button. According to the template file, the use of the Densitometer and the use of the Help do not appear as unnecessary actions, even if the referent did not carry out these actions,
- the learner forgot the following actions: the use the Stop button and checking the Folding Knife Condition,
- the learner did not solve the mechanical problem (crooked Cross Fold and Dog-ear) before the inking problem,

**[0098]** As illustrated in figures 11 and 12, the system 6 can display the information contained in this overview file as described for the first example in reference to figure 4, and can implement the others displays previously described for the first example in reference to figures 4 to 10. The references 21, 22, and 24 have been already described for the first example.

**[0099]** Of course, the invention is not limited to the examples which have just been described and numerous amendments can be made to these examples without exceeding the scope of the invention.

## Claims

1. Learning and training process, comprising:

   - memorizing traces of a learner solving an exercise,
   - attaching meta labels to the learner traces,
   - comparing the learner traces to reference traces of a referent solving the exercise, meta labels being attached to the reference traces

2. Process according to claim 1, **characterized in that** the meta labels are structured XML meta labels

3. Process according to claim 1 or 2, **characterized in that** the comparison step comprises deducing actions forgotten by the learner in relation to those carried out by the referent

4. Process according to any of the previous claims, **characterized in that** the comparison step comprises deducing unnecessary actions done by the learner in relation to those carried out by the referent.

5. Process according to any of the previous claims, **characterized in that** the comparison step comprises comparing the sequence in which problems of the exercise were solved.

6. Process according to any of the previous claims, **characterized in that** the comparison step comprises expressing in percentage a variance between referent results and the learner results.

7. Process according to claim 6, **characterized in that** the results comprise a virtual time for solving the exercise, virtual costs of the exercise and/or statistics on number of learner and referent actions concerning this exercise.

8. Process according to any of the previous claims, **characterized in that** the exercise is created by the referent.

9. Process according to any of the previous claims, **characterized in that** the reference traces are created by the referent according to the following steps:

   - memorizing referent traces of the referent solving the exercise,
   - attaching meta labels to the referent traces,

**10.** Process according to any of the previous claims, **characterized in that** the meta labels of the learner traces are memorized in a learner trace file, and **in that** the meta labels of the referent traces are memorized in a referent trace file, the files containing only key words which are independent of the learner language.

**11.** Process according to any of the previous claims, **characterized in that** the exercise comprises one or more problems to solve.

**12.** Process according to claim 11, **characterized in that** the referent traces comprise at least one trace corresponding to an action that is not necessary to solve the one or more problems.

**13.** Process according to claim 11 or 12, **characterized in that** the exercise contains a set of sequential situations, each situation containing one or more problems to solve, the learner having to solve each problem in a situation before moving on to the next situation.

**14.** Process according to claim 13, **characterized in that** it comprises, at the end of each situation, generating a summary for that situation including the results of the learner concerning this situation.

**15.** Process according to claim 14, **characterized in that** the results comprise a virtual time for solving the situation, virtual costs of the situation and/or statistics on number of learner actions concerning this situation.

**16.** Process according to any of the previous claims, **characterized in that** it comprises a display of the referent traces and/or the learner traces, the process comprising the step of filtering the displayed traces in order to display the traces:

- corresponding to a given problem and/or situation, and/or
- corresponding to a given type of action made by the referent and/or the learner to solve the exercise.

**17.** Process according to any of the previous claims, **characterized in that** it comprises a display of both reference and learner traces at the same time.

**18.** Process according to any of the previous claims, **characterized in that** the comparison step comprises the use of a template file specifying a precision level for comparing the learner traces to the reference traces.

**19.** Process according to any of the previous claims, **characterized in that** it is implemented for the graphic arts industry as a print simulator.

**20.** Learning and training system implementing a process according to any one of the previous claims.

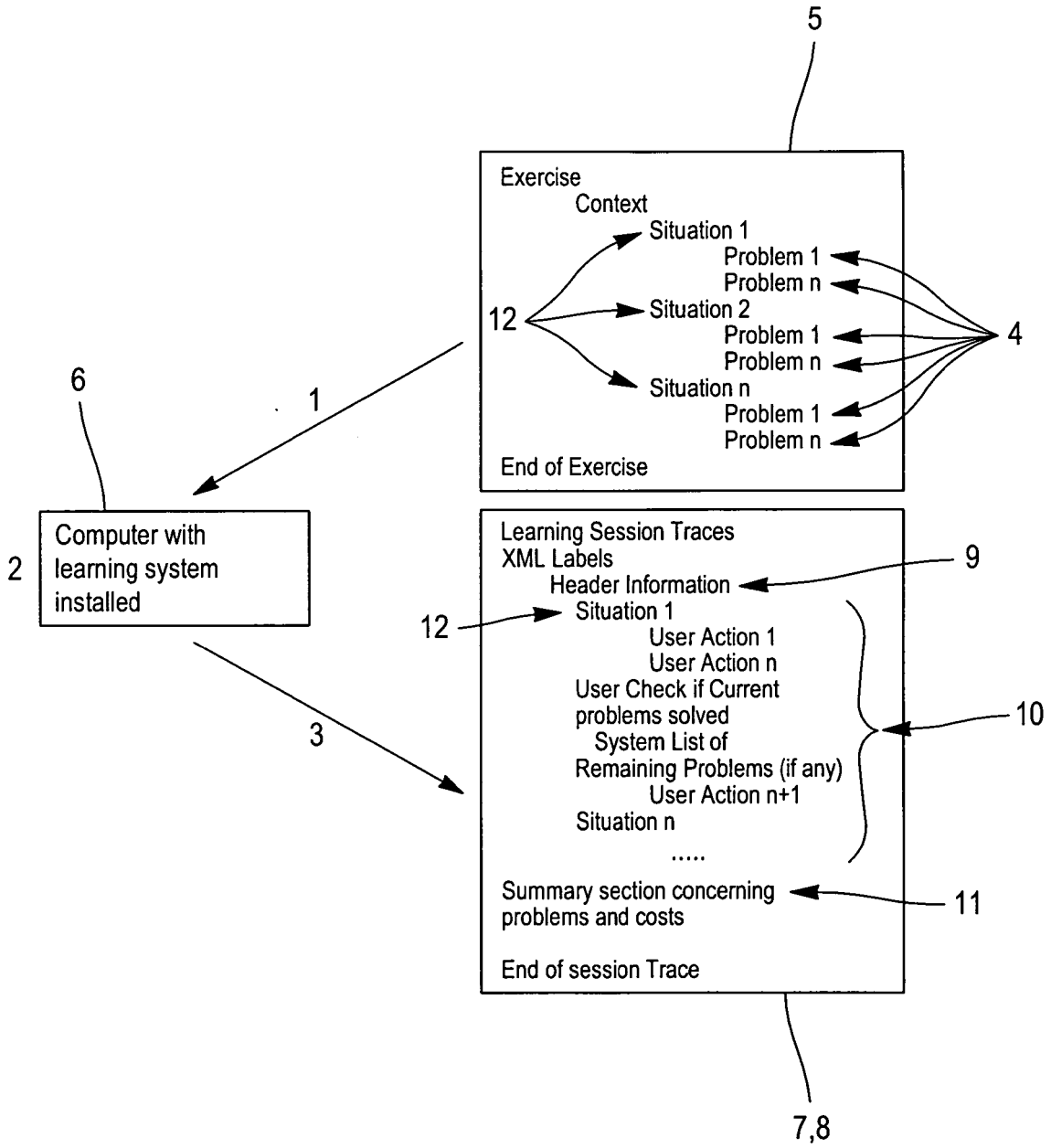
5
Exercise
Context
Situation 1
Problem 1
Problem n
12
Situation 2
Problem 1
Problem n
4
Situation n
Problem 1
Problem n
End of Exercise
6
1
2
Computer with learning system installed
3
Learning Session Traces
XML Labels
9
Header Information
12
Situation 1
User Action 1
User Action n
User Check if Current problems solved
System List of Remaining Problems (if any)
10
User Action n+1
Situation n
.....
Summary section concerning problems and costs
11
End of session Trace
7,8

FIG. 1

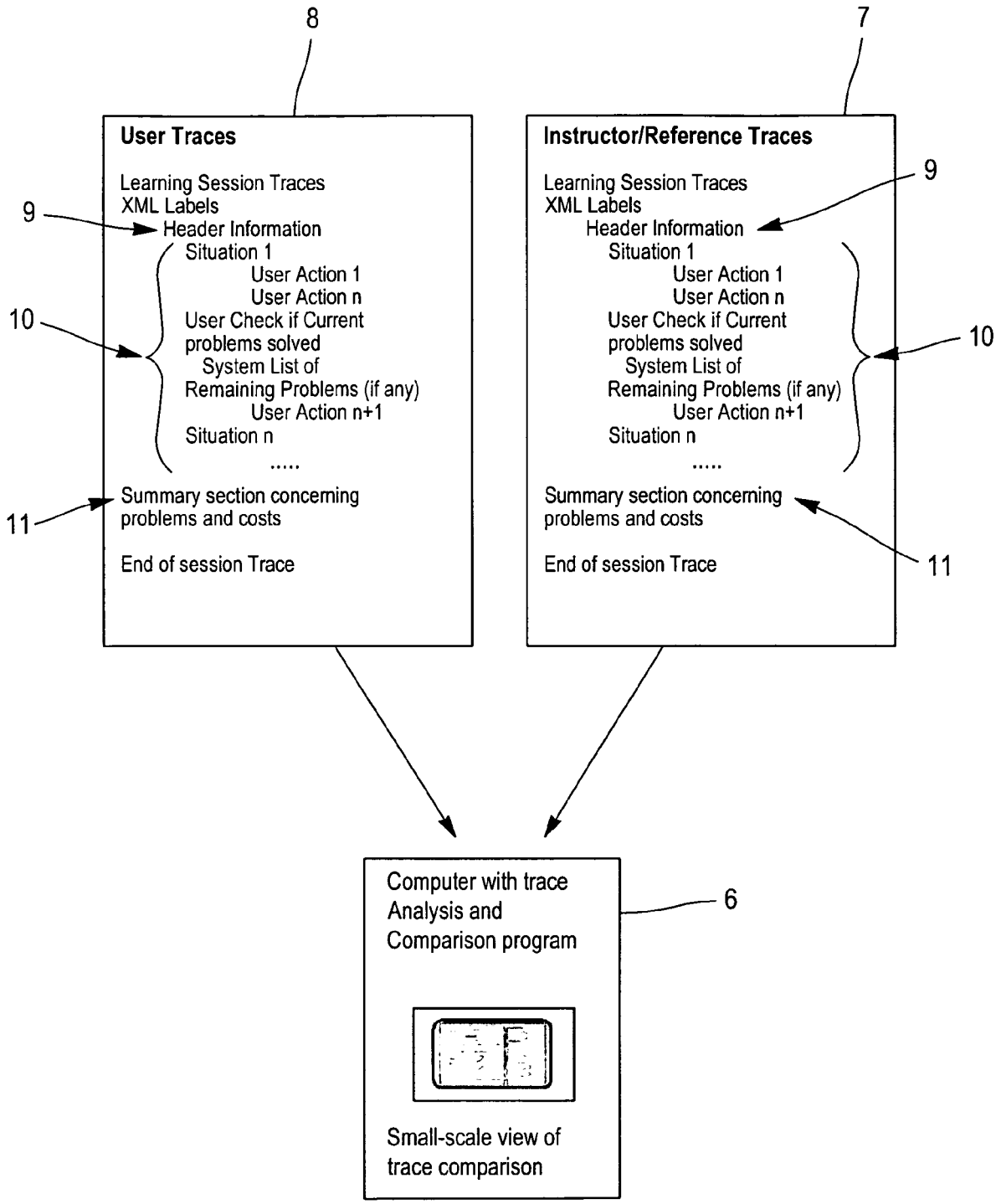
8
7
User Traces
Learning Session Traces
XML Labels
Header Information
Situation 1
User Action 1
User Action n
User Check if Current problems solved
System List of Remaining Problems (if any)
User Action n+1
Situation n
.....
Summary section concerning problems and costs
End of session Trace
Instructor/Reference Traces
Learning Session Traces
XML Labels
Header Information
Situation 1
User Action 1
User Action n
User Check if Current problems solved
System List of Remaining Problems (if any)
User Action n+1
Situation n
.....
Summary section concerning problems and costs
End of session Trace
9
10
11
Computer with trace Analysis and Comparison program
6
Small-scale view of trace comparison

FIG. 2

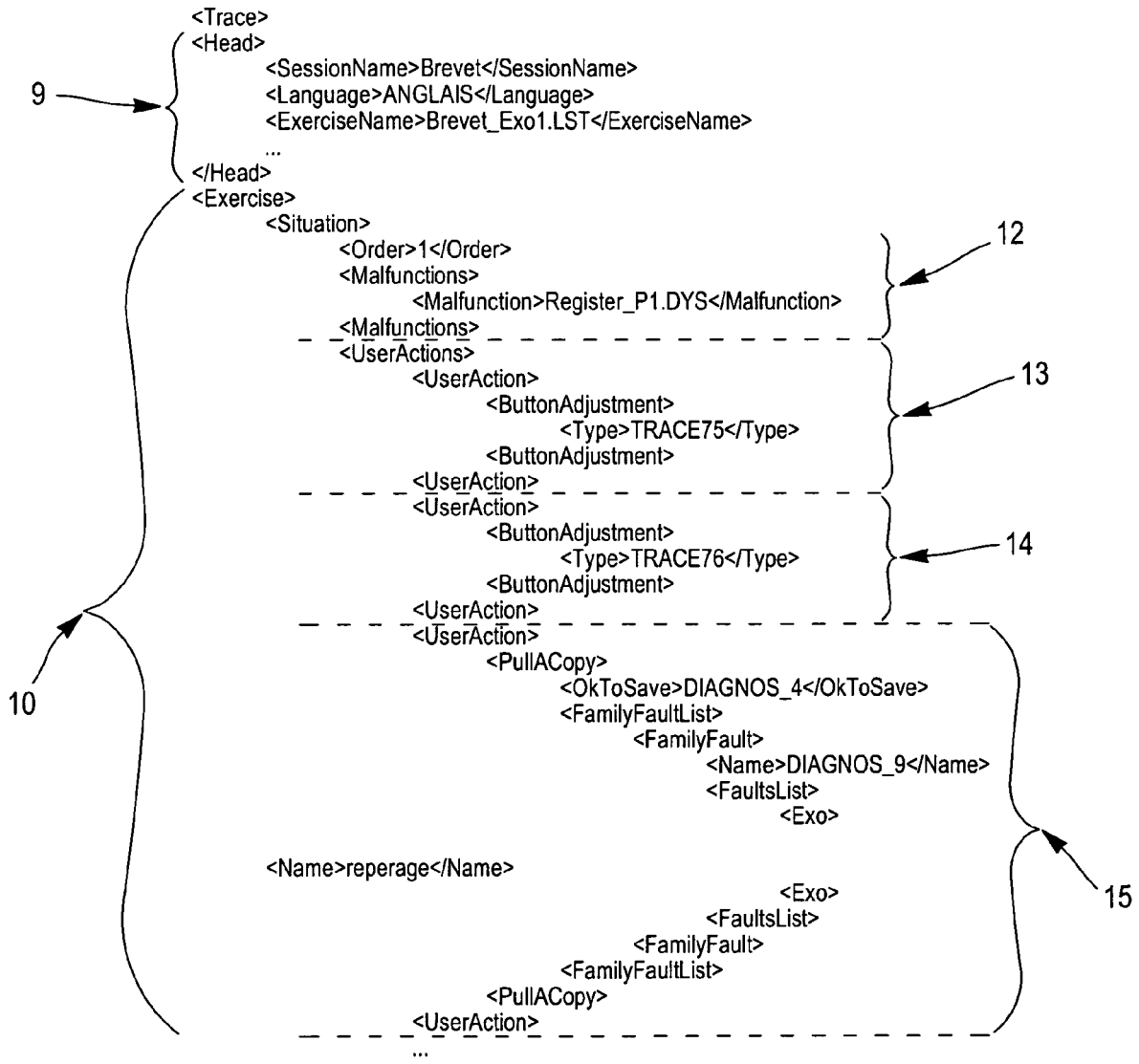
<Trace>
<Head>
<SessionName>Brevet</SessionName>
<Language>ANGLAIS</Language>
<ExerciseName>Brevet_Exo1.LST</ExerciseName>
...
</Head>
<Exercise>
<Situation>
<Order>1</Order>
<Malfunctions>
<Malfunction>Register_P1.DYS</Malfunction>
<Malfunctions>
<UserActions>
<UserAction>
<ButtonAdjustment>
<Type>TRACE75</Type>
<ButtonAdjustment>
<UserAction>
<UserAction>
<ButtonAdjustment>
<Type>TRACE76</Type>
<ButtonAdjustment>
<UserAction>
<UserAction>
<PullACopy>
<OkToSave>DIAGNOS_4</OkToSave>
<FamilyFaultList>
<FamilyFault>
<Name>DIAGNOS_9</Name>
<FaultsList>
<Exo>
<Name>reperage</Name>
<Exo>
<FaultsList>
<FamilyFault>
<FamilyFaultList>
<PullACopy>
<UserAction>
...
9
10
12
13
14
15

FIG. 3

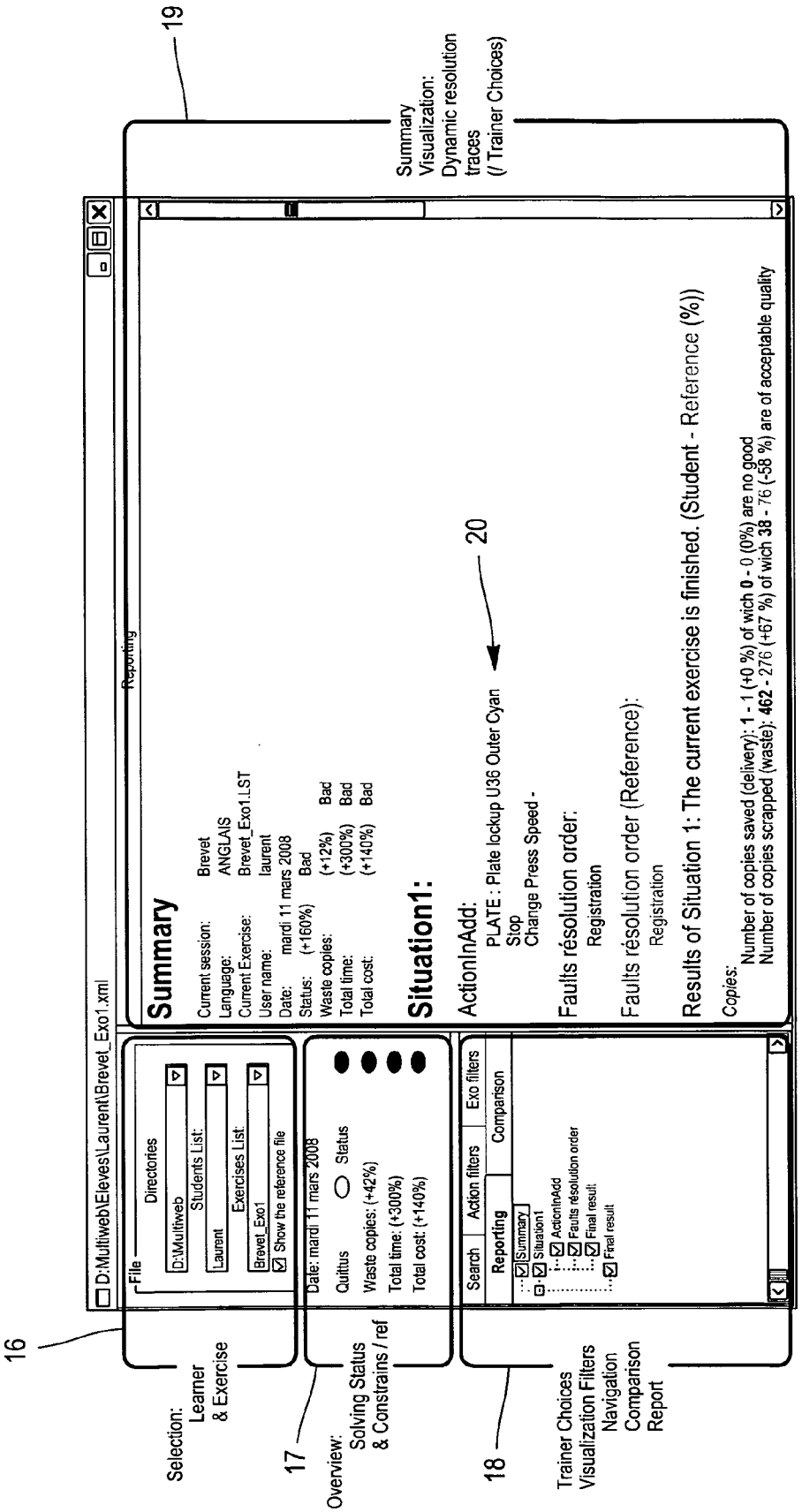
16
Selection:
Learner
& Exercise
17
Overview:
Solving Status
& Constrains / ref
18
Trainer Choices
Visualization Filters
Navigation
Comparison
Report
19
Summary
Visualization:
Dynamic resolution
traces
(/ Trainer Choices)
20
D:\Multiweb\Eleves\Laurent\Brevet_Exo1.xml
File
Directories
D:\Multiweb
Students List:
Laurent
Exercises List:
Brevet_Exo1
Show the reference file
Date: mardi 11 mars 2008
Quittus
Status
Waste copies: (+42%)
Total time: (+300%)
Total cost: (+140%)
Search
Action filters
Exo filters
Reporting
Comparison
Summary
Situation1
ActionInAdd
Faults résolution order
Final result
Reporting
Summary
Current session: Brevet
Language: ANGLAIS
Current Exercise: Brevet_Exo1.LST
User name: laurent
Date: mardi 11 mars 2008
Status: (+160%) Bad
Waste copies: (+12%) Bad
Total time: (+300%) Bad
Total cost: (+140%) Bad
Situation1:
ActionInAdd:
PLATE : Plate lockup U36 Outer Cyan
Stop
Change Press Speed -
Faults résolution order:
Registration
Faults résolution order (Reference):
Registration
Results of Situation 1: The current exercise is finished. (Student - Reference (%))
Copies:
Number of copies saved (delivery): 1 - 1 (+0 %) of wich 0 - 0 (0%) are no good
Number of copies scrapped (waste): 462 - 276 (+67 %) of wich 38 - 76 (-58 %) are of acceptable quality

FIG. 4

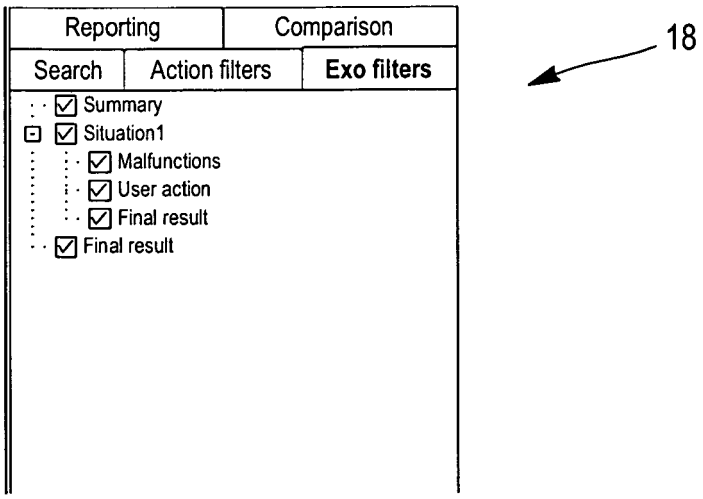
Reporting
Comparison
Search
Action filters
Exo filters
Summary
Situation1
Malfunctions
User action
Final result
Final result
18

FIG. 5

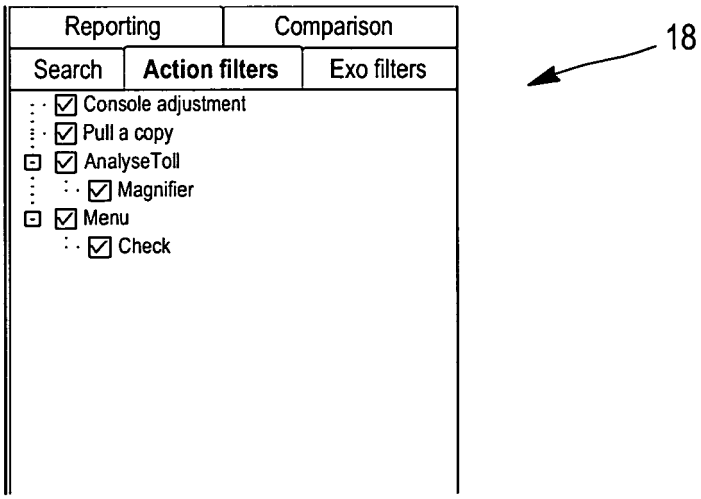
Reporting
Comparison
Search
Action filters
Exo filters
Console adjustment
Pull a copy
AnalyseToll
Magnifier
Menu
Check
18

FIG. 6

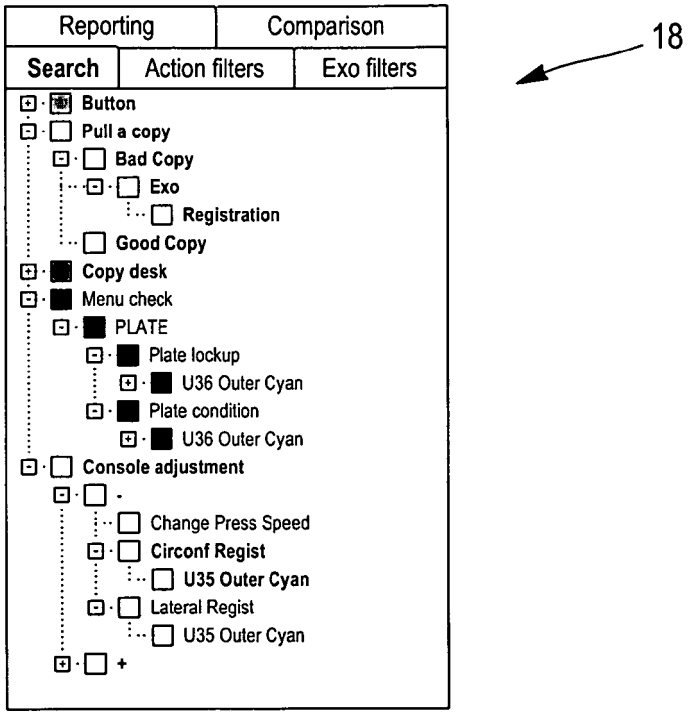
Reporting
Comparison
Search
Action filters
Exo filters
18
Button
Pull a copy
Bad Copy
Exo
Registration
Good Copy
Copy desk
Menu check
PLATE
Plate lockup
U36 Outer Cyan
Plate condition
U36 Outer Cyan
Console adjustment
-
Change Press Speed
Circonf Regist
U35 Outer Cyan
Lateral Regist
U35 Outer Cyan
+

FIG. 7

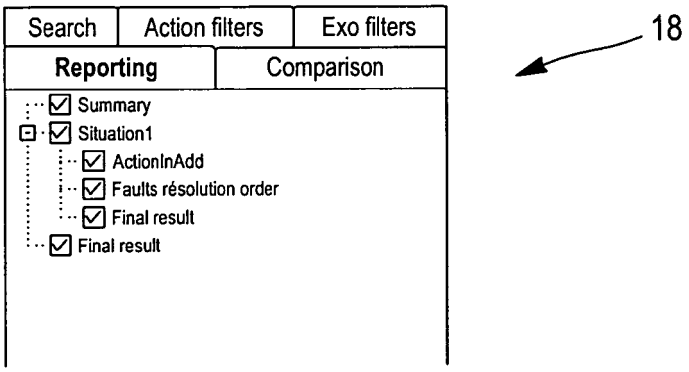
Search
Action filters
Exo filters
Reporting
Comparison
18
Summary
Situation1
ActionInAdd
Faults résolution order
Final result
Final result

FIG. 10

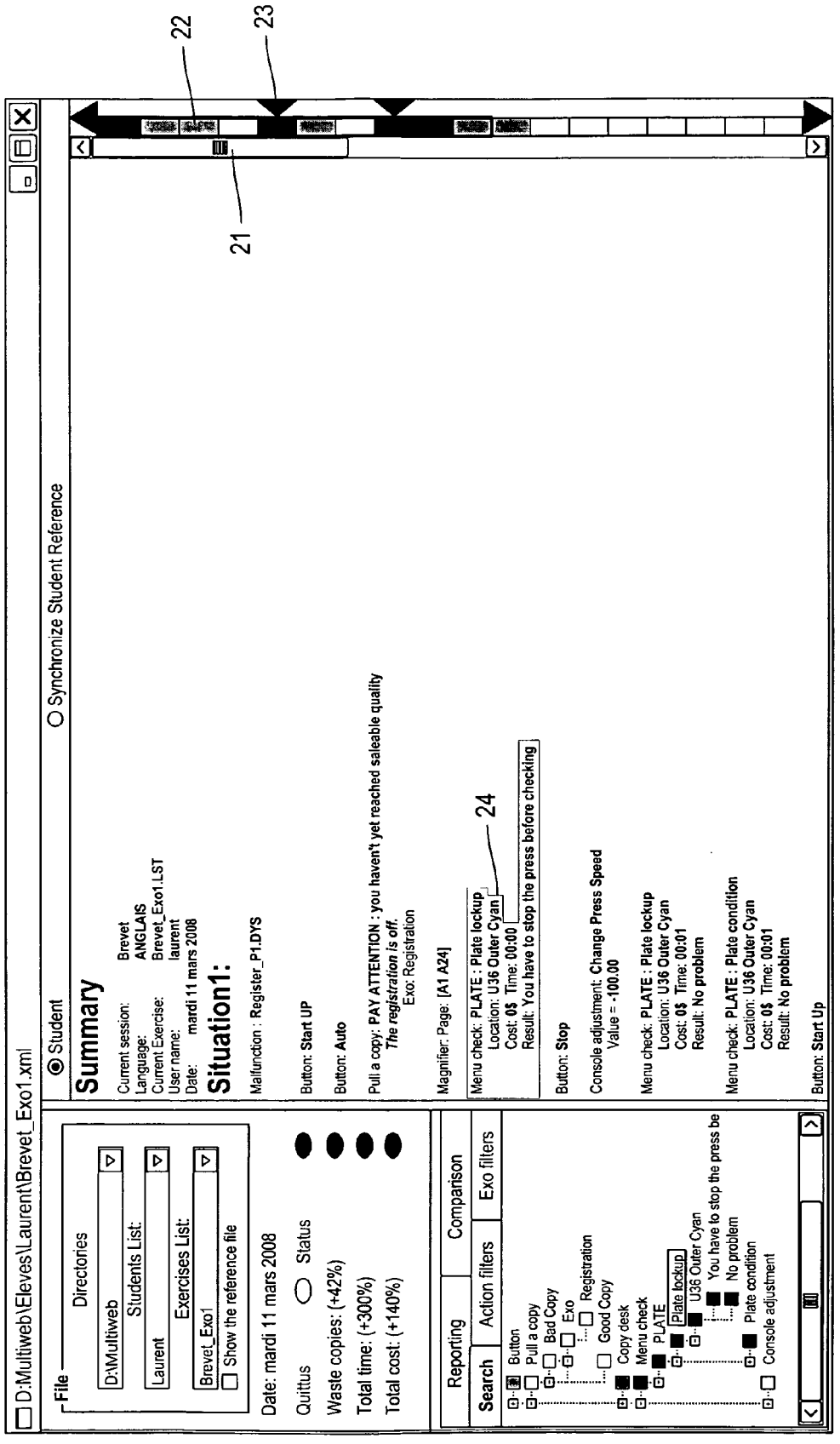
D:\Multiweb\Eleves\Laurent\Brevet_Exo1.xml
File
Directories
D:\Multiweb
Students List:
Laurent
Exercises List:
Brevet_Exo1
Show the reference file
Date: mardi 11 mars 2008
Quittus
Status
Waste copies: (+42%)
Total time: (+300%)
Total cost: (+140%)
Student
Synchronize Student Reference
Summary
Current session: Brevet
Language: ANGLAIS
Current Exercise: Brevet_Exo1.LST
User name: laurent
Date: mardi 11 mars 2008
Situation1:
Malfunction : Register_P1.DYS
Button: Start UP
Button: Auto
Pull a copy: PAY ATTENTION : you haven't yet reached saleable quality
The registration is off.
Exo: Registration
Magnifier: Page: [A1 A24]
Menu check: PLATE : Plate lockup
Location: U36 Outer Cyan
Cost: 0$ Time: 00:00
Result: You have to stop the press before checking
Button: Stop
Console adjustment: Change Press Speed
Value = -100.00
Menu check: PLATE : Plate lockup
Location: U36 Outer Cyan
Cost: 0$ Time: 00:01
Result: No problem
Menu check: PLATE : Plate condition
Location: U36 Outer Cyan
Cost: 0$ Time: 00:01
Result: No problem
Button: Start Up
Reporting
Comparison
Search
Action filters
Exo filters
Button
Pull a copy
Bad Copy
Exo
Registration
Good Copy
Copy desk
Menu check
PLATE
Plate lockup
U36 Outer Cyan
You have to stop the press be
No problem
Plate condition
Console adjustment
21
22
23
24

FIG. 8

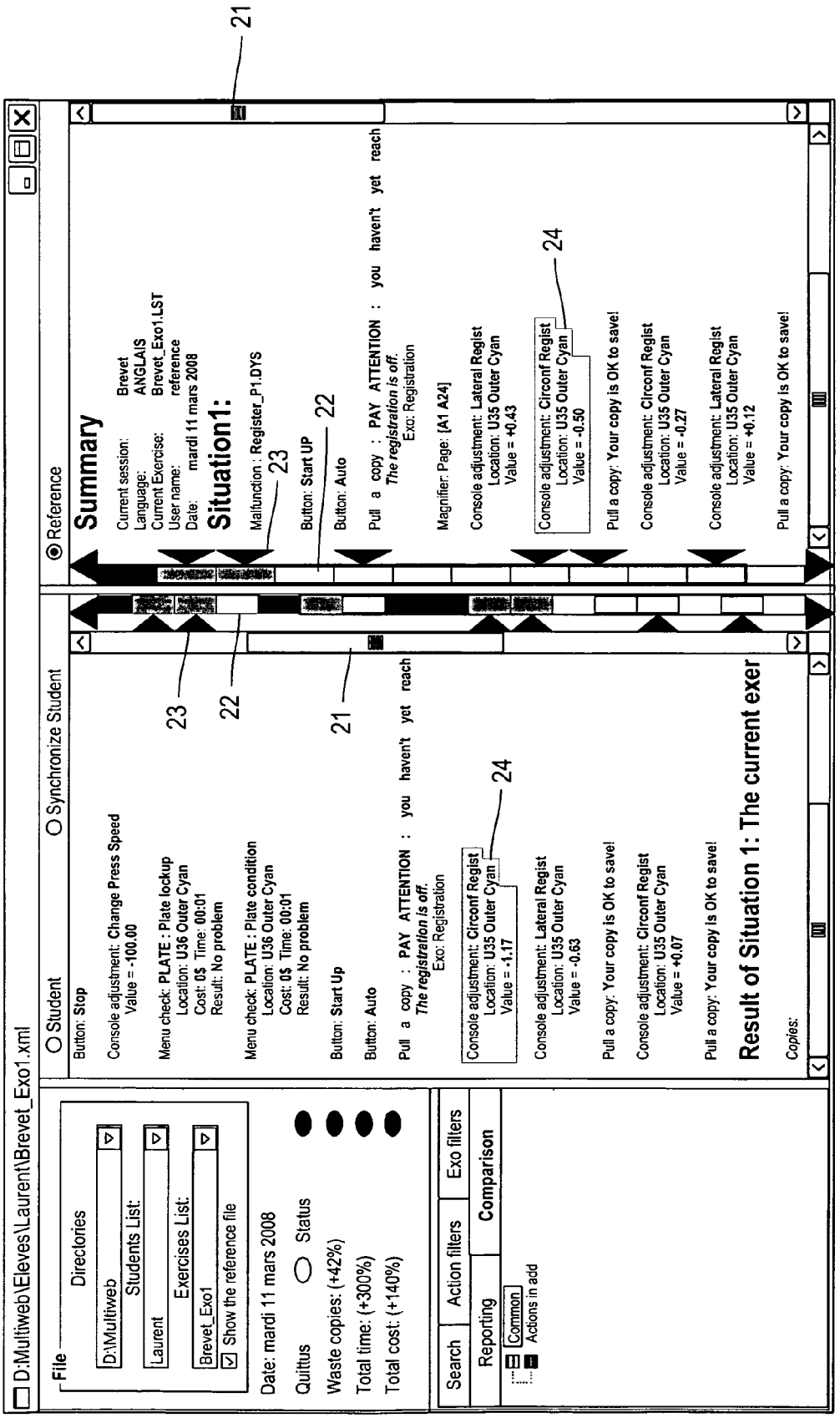
D:\Multiweb\Eleves\Laurent\Brevet_Exo1.xml
File
Directories
D:\Multiweb
Students List:
Laurent
Exercises List:
Brevet_Exo1
Show the reference file
Date: mardi 11 mars 2008
Quittus
Status
Waste copies: (+42%)
Total time: (+300%)
Total cost: (+140%)
Search
Action filters
Exo filters
Reporting
Comparison
Common
Actions in add
Student
Synchronize Student
Reference
Button: Stop
Console adjustment: Change Press Speed
Value = -100.00
Menu check: PLATE : Plate lockup
Location: U36 Outer Cyan
Cost: 0$ Time: 00:01
Result: No problem
Menu check: PLATE : Plate condition
Location: U36 Outer Cyan
Cost: 0$ Time: 00:01
Result: No problem
Button: Start Up
Button: Auto
Pull a copy : PAY ATTENTION : you haven't yet reach
The registration is off.
Exo: Registration
Console adjustment: Circonf Regist
Location: U35 Outer Cyan
Value = -1.17
Console adjustment: Lateral Regist
Location: U35 Outer Cyan
Value = -0.63
Pull a copy: Your copy is OK to save!
Console adjustment: Circonf Regist
Location: U35 Outer Cyan
Value = +0.07
Pull a copy: Your copy is OK to save!
Result of Situation 1: The current exer
Copies:
Summary
Current session: Brevet
Language: ANGLAIS
Current Exercise: Brevet_Exo1.LST
User name: reference
Date: mardi 11 mars 2008
Situation1:
Malfunction : Register_P1.DYS
Button: Start UP
Button: Auto
Pull a copy : PAY ATTENTION : you haven't yet reach
The registration is off.
Exo: Registration
Magnifier: Page: [A1 A24]
Console adjustment: Lateral Regist
Location: U35 Outer Cyan
Value = +0.43
Console adjustment: Circonf Regist
Location: U35 Outer Cyan
Value = -0.50
Pull a copy: Your copy is OK to save!
Console adjustment: Circonf Regist
Location: U35 Outer Cyan
Value = -0.27
Console adjustment: Lateral Regist
Location: U35 Outer Cyan
Value = +0.12
Pull a copy: Your copy is OK to save!
21
22
23
24

FIG. 9

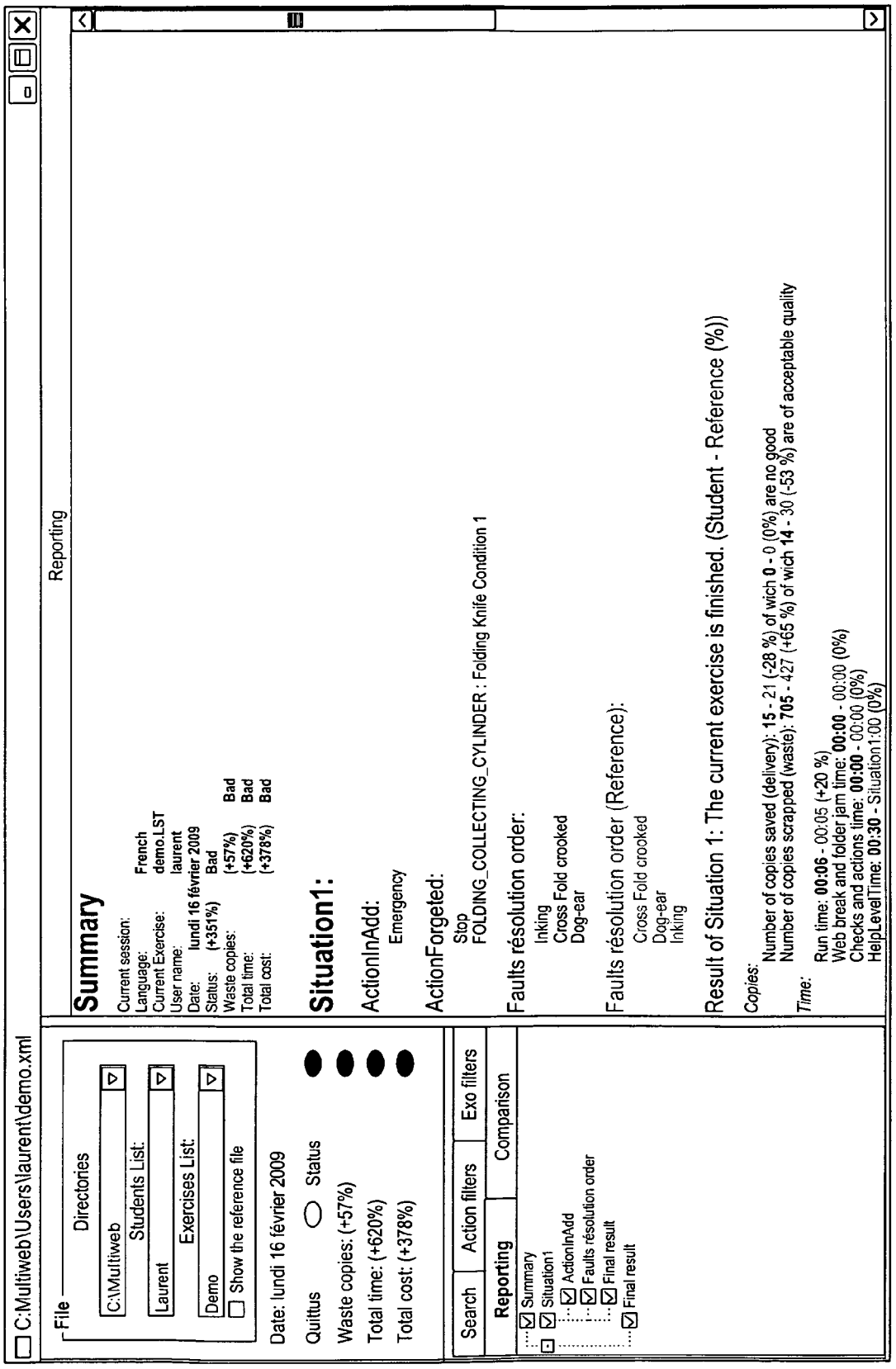
C:\Multiweb\Users\laurent\demo.xml
File
Directories
C:\Multiweb
Students List:
Laurent
Exercises List:
Demo
Show the reference file
Date: lundi 16 février 2009
Quittus
Status
Waste copies: (+57%)
Total time: (+620%)
Total cost: (+378%)
Search
Action filters
Exo filters
Reporting
Comparison
Summary
Situation1
ActionInAdd
Faults résolution order
Final result
Final result
Reporting
Summary
Current session: French
Language: demo.LST
Current Exercise: laurent
User name: lundi 16 février 2009
Date: (+351%) Bad
Status: (+57%) Bad
Waste copies: (+620%) Bad
Total time: (+378%) Bad
Total cost:
Situation1:
ActionInAdd:
Emergency
ActionForgeted:
Stop
FOLDING_CYLINDER : Folding Knife Condition 1
Faults résolution order:
Inking
Cross Fold crooked
Dog-ear
Faults résolution order (Reference):
Cross Fold crooked
Dog-ear
Inking
Result of Situation 1: The current exercise is finished. (Student - Reference (%))
Copies:
Number of copies saved (delivery): 15 - 21 (-28 %) of wich 0 - 0 (0%) are no good
Number of copies scrapped (waste): 705 - 427 (+65 %) of wich 14 - 30 (-53 %) are of acceptable quality
Time:
Run time: 00:06 - 00:05 (+20 %)
Web break and folder jam time: 00:00 - 00:00 (0%)
Checks and actions time: 00:00 - 00:00 (0%)
HelpLevelTime: 00:30 - Situation1:00 (0%)

FIG. 11

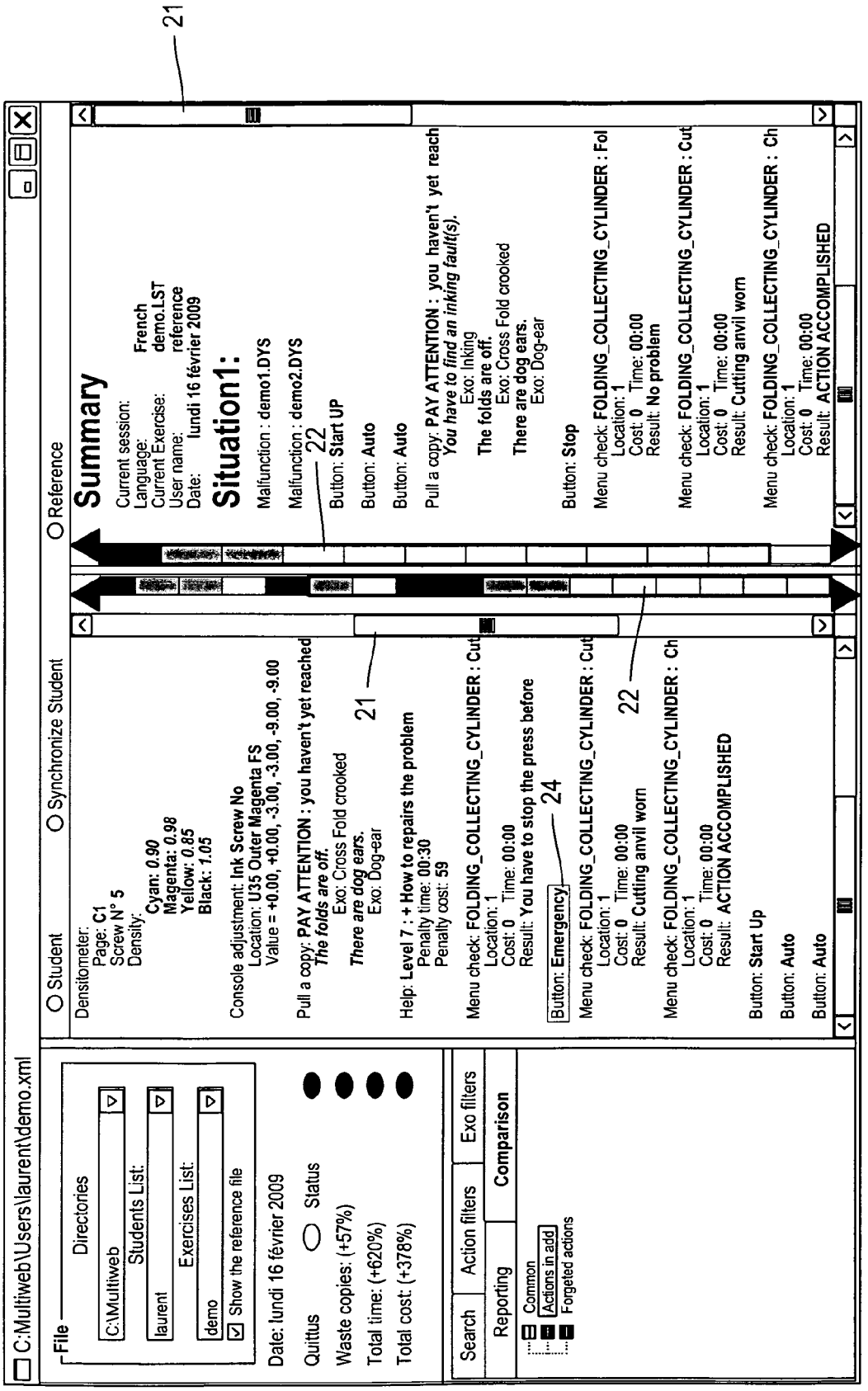
C:\Multiweb\Users\laurent\demo.xml
File
Directories
C:\Multiweb
Students List:
laurent
Exercises List:
demo
Show the reference file
Date: lundi 16 février 2009
Quittus
Status
Waste copies: (+57%)
Total time: (+620%)
Total cost: (+378%)
Search
Action filters
Exo filters
Reporting
Comparison
Common
Actions in add
Forgeted actions
Student
Synchronize Student
Reference
Densitometer:
Page: C1
Screw N° 5
Density:
Cyan: 0.90
Magenta: 0.98
Yellow: 0.85
Black: 1.05
Console adjustment: Ink Screw No
Location: U35 Outer Magenta FS
Value = +0.00, +0.00, -3.00, -3.00, -9.00, -9.00
Pull a copy: PAY ATTENTION : you haven't yet reached
The folds are off.
Exo: Cross Fold crooked
There are dog ears.
Exo: Dog-ear
Help: Level 7 : + How to repairs the problem
Penalty time: 00:30
Penalty cost: 59
Menu check: FOLDING_COLLECTING_CYLINDER : Cut
Location: 1
Cost: 0 Time: 00:00
Result: You have to stop the press before
Button: Emergency
Menu check: FOLDING_COLLECTING_CYLINDER : Cut
Location: 1
Cost: 0 Time: 00:00
Result: Cutting anvil worn
Menu check: FOLDING_COLLECTING_CYLINDER : Ch
Location: 1
Cost: 0 Time: 00:00
Result: ACTION ACCOMPLISHED
Button: Start Up
Button: Auto
Button: Auto
Summary
Current session: French
Language: demo.LST
Current Exercise: reference
User name: lundi 16 février 2009
Date:
Situation1:
Malfunction : demo1.DYS
Malfunction : demo2.DYS
Button: Start UP
Button: Auto
Button: Auto
Pull a copy: PAY ATTENTION : you haven't yet reach
You have to find an inking fault(s).
Exo: Inking
The folds are off.
Exo: Cross Fold crooked
There are dog ears.
Exo: Dog-ear
Button: Stop
Menu check: FOLDING_COLLECTING_CYLINDER : Fol
Location: 1
Cost: 0 Time: 00:00
Result: No problem
Menu check: FOLDING_COLLECTING_CYLINDER : Cut
Location: 1
Cost: 0 Time: 00:00
Result: Cutting anvil worn
Menu check: FOLDING_COLLECTING_CYLINDER : Ch
Location: 1
Cost: 0 Time: 00:00
Result: ACTION ACCOMPLISHED
21
22
24

FIG. 12

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# EUROPEAN SEARCH REPORT

Application Number
EP 09 30 5280

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-/--

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 5 August 2009 | Díaz de Lezana, C |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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# EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 5 August 2009 | Díaz de Lezana, C |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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